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REVIEW OF MALESIAN SPHECINA (HYMENOPTERA, SPHECIDAE, SPHECINAE)

Hensen, R. V., 1991. Review of Malesian Sphecina (Hymenoptera, Sphecidae, Sphecinae). – Tijdschrift voor Entomologie 134: 9-30, figs. 1-65. [ISSN 0040-7496]. Published 1 July 1991.

The species of *Sphex* and *Isodontia* (subtribe Sphecina) in the Malesian region are reviewed. Twenty species are recognized in *Isodontia*, which are segregated into five species-groups, while 21 species are recognized in *Sphex*, divided among three species-groups. Keys are provided to the genera, species-groups and species. Synonymy and distribution of the species is discussed. Twelve new species are described, viz. *I. pilipes* (Burma to Sumatra, Borneo), *I. cestra*, *I. elsei* (both Sulawesi), *I. nidulans* (Philippines), *I. immaculata*, *I. capillata*, *I. delicata*, *I. papua*, *S. wilsoni*, *S. rex* (all New Guinea), *S. solomon* (Solomon Islands), and *S. walshae* (NE India to Sumatra, Borneo). The following new synonymies are established: *Sphex morosus* Smith, 1861, *S. volatilis* Smith, 1861, *S. triodon* Kohl, 1890, *S. abditus* Kohl, 1895 and *S. abditus nugenti* Turner, 1910 are synonymized with *Isodontia aurifrons* (Smith, 1859); *I. diodon alemon* Van der Vecht, 1957 with *I. severini* (Kohl, 1898); *S. ustulatus* Kohl, 1890, *S. simplex* Kohl, 1898 and *S. insularis* Cameron, 1901 with *I. praslinia* (Guérin-Méneville, 1831); *S. albohirtus* (Turner, 1908) with *I. sepicola* (Smith, 1859) and *S. fulvohirtus* Bingham, 1890 with *S. diabolicus* Smith, 1858.

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Key words. – Malesia, Oriental region, Australian region, Sphecidae, *Sphex*, *Isodontia*, taxonomy.

In this paper the species of the subtribe Sphecina comprising the genera *Sphex* Linnaeus and *Isodontia* Patton are briefly treated as far as they occur in the Malesian area. The Malesian area is used here in a broad sense, i. e. comprising Southern Thailand, Malaysia, Indonesia, the Philippines, New Guinea and the Solomon Islands.

Sphex and *Isodontia* are large, active insects, and some of the species treated here are among the most commonly encountered digger wasps in the area. The last comprehensive publication dealing with the Malesian species was that by Kohl (1890), but the taxonomy of the group was updated in many smaller papers (eg. Kohl 1895, 1898, Van der Vecht 1957, 1973). Therefore, it is surprising that so many new species remained undetected. Furthermore, a considerable number of new synonyms were discovered in the course of this study.

Comprehensive diagnoses of the morphology and biology of the two genera were given by Bohart & Menke (1976), and need not be repeated here. One of the aims of this study is to define and diagnose a number of species-groups. Most of these groups are considered monophyletic, being based on inferred synapomorphies. Others, in particular the *Sphex subtruncatus*-group are possibly paraphyletic. It seems premature to pay more attention to the phylogeny of the subtribe here, as a thorough treatment of this subject will require study of all species in these genera.

This paper deals strictly with species: it does not present a classification below the species-level. Although past workers (eg. Van der Vecht & Krombein 1955) have recognized subspecies in the Malesian *Isodontia*, especially for colour differences from island to island, I have not recognized them in this paper. Subspecific names recognized in the past are simply treated here as synonyms of the nominate form. On the other hand, several taxa regarded as subspecies in the past are elevated to species rank.

This study was initiated by dr. J. van der Vecht, and in many instances I have relied on his notes concerning literature, type material and specimens. As far as type specimens are concerned, I have indicated examination by Van der Vecht with a single exclamation mark, by myself with a double exclamation mark after the type depository (e.g. BMNH!!). A question mark behind an abbreviation of a museum means that a type was looked for but not found in that particular museum.

A few thousand specimens were examined in the course of this study. I have refrained from listing these explicitly, except for the type material of new species. The outlines of distribution, as given for each species are entirely based on examination of specimens by me or by Van der Vecht, except as noted.

Abbreviations. – Names of museums in which types are preserved are abbreviated as follows.

BMNH	Natural History Museum, London, England.
BRI	Biosystematics Research Institute, Ottawa, Canada.
BPBM	Bernice P. Bishop Museum, Honolulu, Hawaii, USA.
CAS	California Academy of Sciences, San Francisco, USA.
DEI	Deutsche Entomologische Institut, Eberswalde, Germany.
IRSN	Institut Royal de Sciences Naturelles, Brussels, Belgium.
MCG	Museo Civico di Storia Naturale, Genova, Italy.
MCZ	Museum of Comparative Zoology, Cambridge, Massachusetts, USA.
MNHN	Muséum National d'Histoire Naturelle, Paris, France.
NMB	Naturhistorisches Museum, Basel, Switzerland.
NMW	Naturhistorisches Museum, Vienna, Austria.
OUM	Oxford University Museum, Oxford, England.
RMNH	Nationaal Natuurhistorisch Museum, Leiden, The Netherlands.
TMB	Termeszettudomanyi Muzeum, Budapest, Hungary.
USNM	National Museum of Natural History, Smithsonian Institution, Washington, D. C., USA.
UZMC	Universitetets Zoologisk Museum, Copenhagen, Denmark.
ZMB	Zoologisches Museum der Humboldt-universität, Berlin, Germany.

The following morphological terms are abbreviated.

IOC	Shortest interocular distance across the clypeus.
IOV	Shortest interocular distance across the vertex.

ACKNOWLEDGEMENTS

Dr. J. van der Vecht donated his personal notes and provided many of the specimens that formed the foundation of this study. The following persons aided in various ways, including arranging loans of material, assistance and hospitality at my visits to various museums, etc. In alphabetical order: Dr. ing. C. van Achterberg, Leyden; Dr. J. M. Carpenter, Cambridge, Mass.; Dr. J. Casevitz-Weulersse, Paris; Dr. P. Dessart, Brussels; Dr. M. Fischer, Vienna; Dr. F. Koch, Berlin; Dr. O. Lomholdt, Copenhagen; Dr. A. S. Menke, Washington DC.; Mr. G. M. Nishida, Honolulu; Dr. J. Oehlcke, Eberswalde; Dr. C. O'Toole, Oxford; Dr. J. Papp, Budapest; Dr. W. J. Pulawski, San Francisco; Dr. M. Sharkey, Ottawa; Mr. C. R. Vardy, London.

I wish to express my sincere gratitude to these persons, and others who took a constructive interest in my activities. Special thanks are due to Dr. A. S. menke for reviewing the manuscript.

A visit to the Natural History Museum, London, and a collecting trip to Indonesia were supported by the Uyttenboogaart-Eliasen Stichting.

SYSTEMATIC PART

Key to genera and species-groups

1. Sides of propodeum with complete spiracular groove; basal vein of second submarginal cell as long as or longer than anterior vein; female with well developed tarsal rake, composed of long, flattened spines (fig. 62) (*Sphex*) 2
– Sides of propodeum without spiracular groove; basal vein of second submarginal cell usually shorter than anterior vein; female without tarsal rake (*Isodontia*) 4
2. Metanotum medially with pair of tubercles or with single tubercle, that is more or less impressed medially .... group of *S. argentatus* (p. 20)
– Metanotum without tubercles, flat or slightly convex medially 3
3. Scutellum of female flat, shiny (sometimes densely covered with tomentum); male flagellum without placoids; claw teeth small, perpendicular to claw (fig. 59) .... group of *S. resplendens* (p. 22)
– Scutellum of female convex, often with median furrow, usually dull; at least fifth flagellomere of male with placoid (figs. 43-45); claw teeth large, at sharp angle to claw (fig. 60).......... .... group of *S. subtruncatus* (p. 26)
4. Males.. 5
– Females 9
5. Mandibles bidentate 6
– Mandibles tridentate 7
6. Mandibles very slender, nearly straight (fig. 8); inner orbits strongly converging below; petiole

longer than hind basitarsus; small, slender species, body length 13-19 mm .... group of *I. diodon* (p. 14)

– Mandibles stout and arcuate (fig. 6); inner orbits parallel or slightly diverging below; petiole shorter than hind basitarsus; large, stout species, body length 20-28 mm .... group of *I. chrysorrhoea* (p. 13)

7. Fourth flagellomere with well defined placoid (figs. 35-38) ..... group of *I. praslinia* (p. 19)

– Flagellum without placoids 8

8. Basal inner tooth of mandible strongly developed, much stronger than second inner tooth (fig. 10); basal half of clypeus with blunt longitudinal carina .... group of *I. ochroptera* (p. 19)

– Basal inner tooth of mandibles smaller (fig. 2); basal half of clypeus at most with trace of longitudinal carina .... group of *I. aurifrons* (p. 11)

9. Widest part of frons slightly narrower than clypeus in the middle, inner orbits slightly diverging below; outer side of hind tibia with more than 20 short spines; body length 29-35 mm .... group of *I. chrysorrhoea* (p. 13)

– Inner orbits parallel or converging below; outer side of hind tibia with at most 10-12 short spines; body length 14-26 mm 10

10. Mandibles very slender, straight, apically bifid (fig. 7); hind tibiae with 1-3 short spines on outer side; fourth segment of hind tarsi wider than long .... group of *I. diodon* (p. 14)

– Mandibles robust, curved, apically tridentate (fig. 9); hind tibiae with 5-10 spines on outer side; fourth segment of hind tarsi elongate 11

11. Labrum with single median longitudinal carina, that does not project apically; apical margin of clypeus with pair of well differentiated teeth (fig. 9); pilosity of head and mesosoma black .... group of *I. ochroptera* (p. 19)

– Labrum apically with two parallel, raised, projecting carinae; apical clypeal margin medially notched (fig. 11), or with pair of short teeth (fig. 1); pilosity variable 12

12. First flagellomere distinctly longer than second; antennae not or hardly longitudinally ridged (fig. 21); mandible stout (fig. 11) .... group of *I. praslinia* (p. 19)

– First flagellomere hardly longer than second (fig. 19), or (*I. pilipes*) mandibles slender (fig. 3); antennae longitudinally ridged (fig. 19) .... group of *I. aurifrons* (p. 11)

Genus *Isodontia* Paton

Group of *Isodontia aurifrons*

Diagnosis

Body length ♂ 25-23 mm, ♀ 17-26 mm. Labrum of female with a pair of short parallel projecting carinae apically; mandible tridentate in both sexes, sometimes with weak third inner tooth near apex; clypeus of female with median notch; first flagellomere as long as second; flagellum of female usually with longitudinal sulci on second to tenth segment; third to seventh flagellomere in male with convex, papillate sensory areas; outer side of hind tibia with 5-9 short spines; petiole usually shorter than hind basitarsus.

Species included

Species treated. – *I. aurifrons* (Sm.), *formosicola* (Strand), *pilipes* sp. n.

Other included species. – *I. maidli* (Yasumatsu) from Japan.

Key to species

1. Females 2

– Males 4

2. First flagellomere much longer than second (fig. 20); Burma, Sumatra, Borneo .... *pilipes* sp. n.

– First flagellomere not or scarcely longer than second (fig. 19) 3

3. Metasoma largely or entirely dull red; clypeus with median carina over most of its length; Taiwan, China, S. Thailand, Malaysia, Sumatra, Borneo .... *formosicola* (Strand)

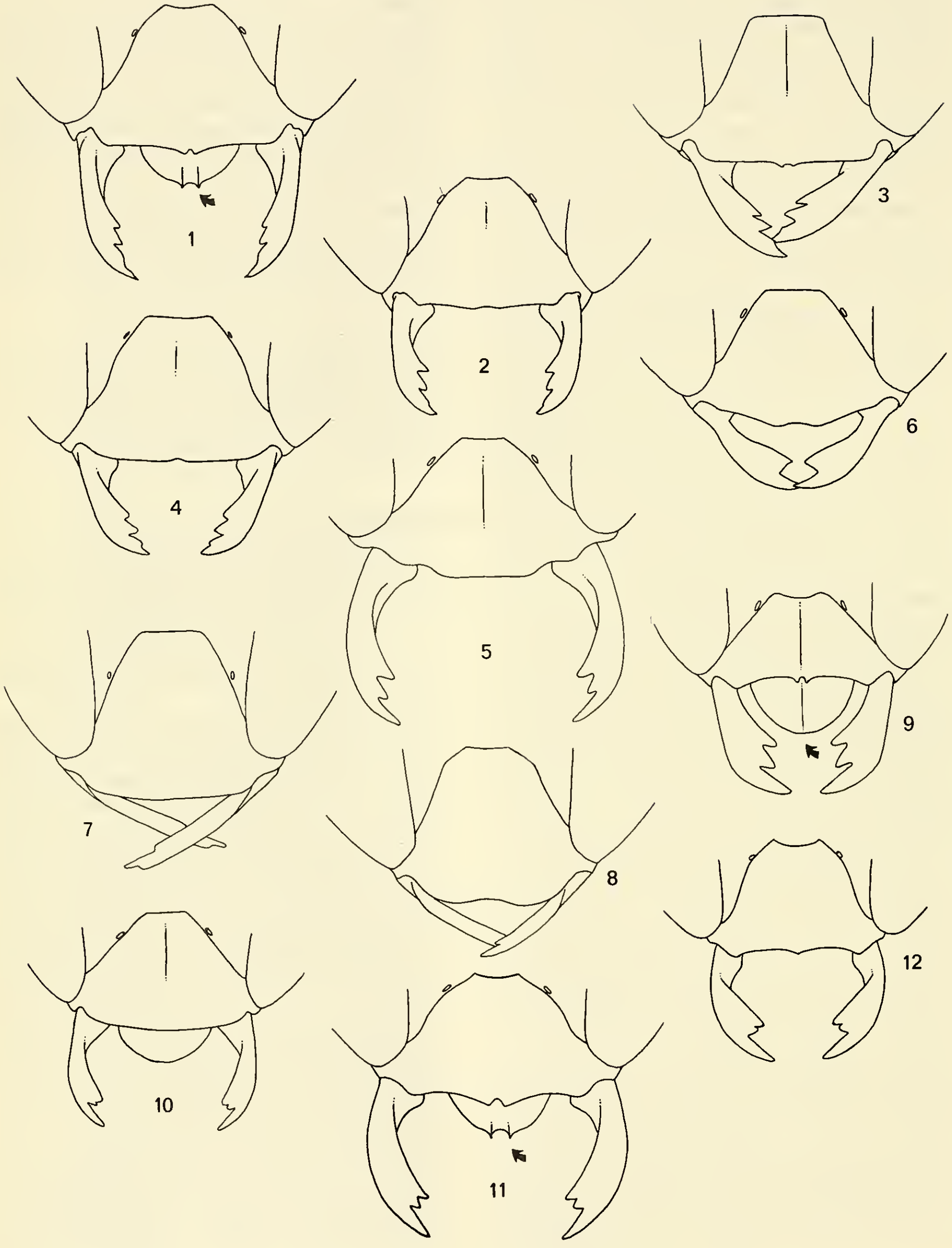
– Metasoma entirely black; clypeus with short carina near base or medially; Sikkim to China and Malaysia, Malesian region, Queensland .... *aurifrons* (Smith)

4. Metasoma largely dull red; third flagellomere as long as second (fig. 23); clypeus apically with pair of short teeth; wings yellowish .... *formosicola* (Strand)

– Metasoma entirely black; third flagellomere longer than second; clypeus apically without teeth (fig. 2); wings brown or clear 5

5. Petiole as long as hind basitarsus; first flagellomere longer than second (fig. 24) .... *pilipes* sp. n.

– Petiole shorter than hind basitarsus; first flagellomere as long as second (fig. 22) .... *aurifrons* (Smith)



Figs. 1-12. *Isodontia*, clypeus and mandibles. – 1, *aurifrons*, ♀; 2, *aurifrons*, ♂; 3, *pilipes*, ♀; 4, *pilipes*, ♂; 5, *chrysorrhoea*, ♀; 6, *chrysorrhoea*, ♂; 7, *cestra*, ♀; 8, *delicata*, ♂; 9, *ochroptera*, ♀; 10, *ochroptera*, ♂; 11, *praslinia*, ♀; 12, *praslinia*, ♂.

Isodontia aurifrons (Smith)
(figs. 1-2, 19, 22)

Sphex aurifrons Smith, 1859: 157. Lectotype ♀ (present designation): Indonesia, Aru (OUM!!)
Sphex morosus Smith, 1860: 122. Holotype ♂: Indonesia, Bacan (OUM!!) Syn. n.
Sphex volatilis Smith, 1860: 122. Holotype ♀: Indonesia, Bacan (OUM!!) Syn. n.
Sphex triodon Kohl, 1890: 377. Lectotype ♂ (present designation): Indonesia, Java (NMW!!) Syn. n.
Sphex abditus Kohl, 1895: 51. Holotype ♀: Sikkim (NMW!!) Syn. n.
Sphex abditus nugenti Turner, 1910a: 343, 345. Holotype ♀: Australia, Cairns (BMNH!!) Syn. n.

Distribution. – Continental Asia from Southern India and Sri Lanka to China and Malaysia, Indonesia, Philippines, New Guinea, Queensland.

Isodontia formosicola (Strand)
(fig. 23)

Sphex (Isodontia) formosicola Strand, 1913: 82. Lectotype ♀ (present designation): Taiwan: Hoozan (DEI!!)

Distribution. – Continental Asia from China to Malaysia, Taiwan, Sumatra, Borneo.

Isodontia pilipes sp. n.
(figs. 3-4, 20, 24, 46)

Type material. – Holotype ♂, Indonesia, 'S. Sumatra, + 600 m, Res. Benkoelen, Tandjong Sakti, 16-19 VII, M. E. Walsh leg. 1935' (RMNH). – Paratypes. Burma: Tenasserim, Ihaungyin Valley, v.1893, '*Sphex aurifrons* Sm., ♂' (1 ♀), Tenasserim, Ataran Valley, xii.1891 (1 ♀), Burma, Middle Tenasserim, Haundraw Valley, viii.1894 (1 ♀), all C. T. Bingham (BMNH). Indonesia: S. Sumatra, Benkulen, 50 m, 19-21.v.1935, M. E. Walsh (1 ♂, RMNH); W. Sumatra, Padangpanjang, 800 m, 1.v.1988, R. Hensen (1 ♂, RMNH). Malaysia: Sabah, Ranau 8 mi. N., Paring Hot Springs, 500 m, 8-11.x.1958, L. W. Quate (1 ♂, BMNH); Borneo, , v.1900, P. Cameron coll., '*Sphex nigripes*, Sm.' (1 ♀, BMNH); Borneo, Kuching, v.1900 (1 ♂, BMNH).

Diagnosis
Within the *aurifrons*-group, *pilipes* is characterized by the first flagellomere being distinctly longer than the second. Additionally, in the male, the petiole is as long as the hind basitarsus (shorter in the other species). *I. pilipes* may actually be closest to the Japanese *I. maidli* (Yasumatsu). It differs from that species in the male by the presence of hair-fringes on the sternites, and in the relative lengths of the proximal flagellomere (1 : 1 : 1.4 in *maidli*). In the female *I. pilipes* is characterized by the dark hind tibiae (reddish in *maidli*) and the presence of transverse rugae medially on the propodeum.

Description
Female. – Body length 17.5-21.0 mm; length of forewing 12.5-15.0 mm. Black, mandible medially reddish, tegulae with margin brownish yellow or reddish, distinctly lighter than the center. Wings yellowish, apical margins and particularly apex of forewing infuscated. Erect pilosity of head and mesosoma brown but yellowish on genae, venter of mesosoma and propodeum. Face with rather sparse silvery tomentum, mesosoma without conspicuous tomentum. Clypeus 0.9 times as long as IOC, with median carina on dorsal half; IOV 1.0 times IOC; relative lengths of flagellomeres I-III 1 : 0.8 : 0.85; mandibles slender. Mesoscutum shiny, sparsely finely punctate, punctures on disc 1-3 diameters apart; propodeal dorsum shiny, rugose-punctate, with short transverse rugae medially. Petiole 0.8 times as long as hind basitarsus.

Male. – Body length 15.0-17.0 mm; length of forewing 11.0-12.5 mm. Like the female, except for the following. Black; mesoscutum with faint greyish shine. Wings light brown, with violaceous shine. Erect pilosity of head brownish to black, of mesosoma yellowish grey, but darker on mesoscutum. Clypeus 0.85 times as long as IOC; IOV 1.0-1.1 times IOC (1.0 in type); relative lengths of flagellomeres I-III 1 : 1.0 : 1.3; flagellomeres III-VIII with convex, papillate sensory areas; mandible with faint third inner tooth near apex; propodeal dorsum finely punctate-reticulate. Petiole 1.0-1.05 times as long as hind basitarsus; fourth to seventh sternite with fringes of appressed brown setosity; gonostyle simple.

Etymology
Pilipes is a noun in apposition, from Latin *pilus* = hair and *pes* = leg.

Group of *Isodontia chrysorrhoea* (Kohl)

Diagnosis
Body length ♀ 29-34 mm, ♂ 20-28 mm; immediately recognized by their large size, and the presence of yellow bands on the metasoma. Female: labrum not modified; mandible tridentate; clypeus rounded; first flagellomere distinctly longer than second. Male: mandible bidentate; clypeus shallowly emarginate; fourth to sixth flagellomere with broad, convex papillate sensory area.

Species included
Species treated. – *I. chrysorrhoea* (Kohl).

Other included species. – *I. auripygata* Strand from Taiwan, China and Vietnam.

Isodontia chrysorrhoea (Kohl)
(figs. 5-6, 25)

Sphex apicalis Smith, 1856; 253. Holotype ♀: Indonesia, Sumatra (BMNH!!) [non Smith, 1856: 262].
Sphex (Isodontia) chrysorrhoeus Kohl, 1890: 371 [new name for *S. apicalis* Smith, 1856: 253].
Sphex (Isodontia) hewitti Cameron, 1906: 119. Holotype ♂: Malaysia, Sarawak, Kuching (BMNH!!).

Distribution. – S. Thailand, Indonesia (Sumatra, Java, Borneo, Nias), Malaysia (Sarawak); Philippines (Mindanao).

Group of *Isodontia diodon* (Kohl)

Diagnosis

Body length ♂ 12-18 mm, ♀ 14-19 mm. Labrum of female simple; mandible abnormally slender, nearly straight, bidentate in male, the apex bifid in female and with small outer tooth; clypeus of female simple; relative lengths of flagellomeres variable; flagellum of female without sensory areas; flagellum of male with flat placoids on one or more flagellomeres or with broad, convex, papillate sensory areas. Scutellum and metanotum convex; propodeal dorsum reticulate to transversely strigose; outer side of hind tibia with 1-3 spines. Petiole usually longer than hind basitarsus.

Species included

Species treated. – *I. capillata* sp. n., *cestra* sp. n., *delicata* sp. n., *diodon* (Kohl), *egens* (Kohl), *franzi* (Kohl), *immaculata* sp. n., *papua* sp. n., *permutans* (Turner), *severini* (Kohl).

Other included species. – *I. nigelloides* (Strand) from Sri Lanka and Southern India and an unnamed Australian species.

Key to species

1. Females (unknown: *capillata*, *delicata*, *papua*) 2
- Males (unknown: *franzi*) 8
2. Forewing with sharply differentiated dark mark apically 3
- Forewing darkened apically, but dark area not sharply delimited 6
3. Facial tomentum golden 4
- Facial tomentum silvery 5
4. Petiole as long as hind basitarsus; first metasomal tergite black, laterally reddish translucent; Sulawesi .... *cestra* sp. n.
- Petiole longer than hind basitarsus; first metasomal tergite red; Sumatra, Java, Borneo, Philippines, Nusa Tenggara, Moluccas .... *severini* (Kohl)
5. Metasoma, except petiole, entirely red; Borneo .... *franzi* (Cameron)
- Metasoma black, with at most first tergite and posterior margins of other tergites reddish; Nepal to China and Singapore .... *diodon* (Kohl)
6. Facial tomentum golden (except specimens from Gizo Isl.); New Guinea, Solomon Islands .... *permutans* (Turner)
- Facial tomentum silvery 7
7. Mesosoma with conspicuous silvery tomentum on pronotal lobes, metanotum and sides of propodeum; New Guinea, Bismarck Islands, Biak .... *egens* (Kohl)
- Mesosoma without silvery tomentum: Bismarck Islands .... *immaculata* sp. n.
8. Flagellomeres I-II short, III at least twice as long as I (eg. fig. 26) 9
- Flagellomeres I-II longer, III at most 1.5 times as long as I (eg. fig. 27) 14
9. Flagellomeres III-VI with broad, flat placoids over their entire length (figs. 26, 30, 31) 10
- Flagellomere III at most with small apical placoid (figs. 28, 32) 13
10. Posterior tergites with conspicuous, dense yellow pilosity; gonostyles apicodorsally with sharply pointed process (fig. 47); New Guinea .... *capillata* sp. n.
- Facial tomentum silvery; posterior tergites with sparse white or yellowish pilosity; gonostyles apicodorsally rounded (figs. 52, 54) or with broad angle (fig. 51) 11
11. Mesosoma without tomentum; gonostyles apicodorsally swollen and rounded (fig. 52); Bismarck Islands .... *immaculata* sp. n.
- Mesosoma with conspicuous silvery or golden tomentum on pronotal lobes, metanotum, sides of propodeum; gonostyles either angularly raised apicodorsally (fig. 51), or simply rounded (fig. 54) 12
12. Gonostyles simply rounded apicodorsally (fig. 54); tomentum of mesosoma golden or (Solomon islands) pilosity brown; New Guinea, Solomon Islands .... *permutans* (Turner)
- Gonostyles apicodorsally raised into a broad angle (fig. 51); tomentum of mesosoma silvery, pilosity pale; New Guinea, Bismarck Islands, Biak .... *egens* (Kohl)
13. Flagellomere III with small apical placoid, IV-VI with long, narrow, concave placoids (fig. 28); sternite V-VII with fringes of yellow setosity; New Guinea .... *delicata* sp. n.
- Flagellomere IV with long, narrow, concave placoid, V with small apical placoid (fig. 32); sternites without fringes, only with sparse yellow pilosity; New Guinea .... *papua* sp. n.
14. Only flagellomeres IV-V with placoids (fig. 27); Sulawesi .... *cestra* sp. n.
- Flagellomeres (II-) III-V with broad, convex placoid (figs. 29, 33) 14
15. Flagellomere III 1.4 times as long as I (fig. 33);

lower apical angle of gonostyle acute (fig. 50); facial tomentum usually silvery; Nepal to China and Singapore .... *diodon* (Kohl)

- Flagellomere III 1.1-1.2 times as long as I (fig. 29); lower apical angle of gonostyle a right angle (fig. 55); facial tomentum golden or pale golden; Sumatra, Borneo, Java, Nusa Tenggara, Moluccas, Philippines .... *severini* (Kohl)

Isodontia capillata sp. n.
(figs. 26, 47)

Type material. – Holotype ♂, Indonesia, Irian Jaya, Jayapura, xii.1936, W. Stüber (RMNH). – Paratypes: Indonesia: Irian Jaya, Jayapura, vii.1938, L. J. Toxopeus (1 ♂, RMNH). Papua New Guinea: Madang Province, Duru, 15 km SW. Madang, ca. 5° 20 S, 145° 43 E, 14.iii.1987, W. J. Pulawski (1 ♂, CAS).

Diagnosis
Differing from all other species of this group by the dense yellow pilosity covering the posterior tergites, and by the shape of the gonostyles (fig. 47).

Description
Male. – Body length 15.0-16.5 mm, length of forewing 11.0-12.0 mm. Black; mesoscutum with fine oily shine; posterior margins of tergites broadly reddish to yellowish translucent. Wings light brownish hyaline, apically infuscated. Erect pilosity of head and mesosoma yellow; facial tomentum golden; mesosoma with conspicuous golden tomentum on pronotum, sides of mesoscutum, metanotum, mesopleuron and sides of propodeum; metasoma with very conspicuous pale yellow pilosity, dense and erect on posterior tergites. Clypeus 1.0 times as long as IOC, with vague median carina; IOV 1.1 times IOC; relative lengths of flagellomeres I-III 1: 1.4 : 2.6; third to sixth flagellomere with broad flat placoid. Mesoscutum densely rather finely punctate, punctures on disc 0.5-1 diameter apart; propodeal dorsum shiny, anteriorly transversely strigose, posteriorly very densely punctate. Petiole 1.2 times as long as hind basitarsus; sternites without fringes, only seventh sternite with some longer pilosity; eighth sternite apically truncate; gonostyle apically with strong tooth pointing upward.

Etymology
Capillata is an adjective, from Latin *capillatus* = long-haired.

Isodontia cestra sp. n.
(figs. 7, 27, 48)

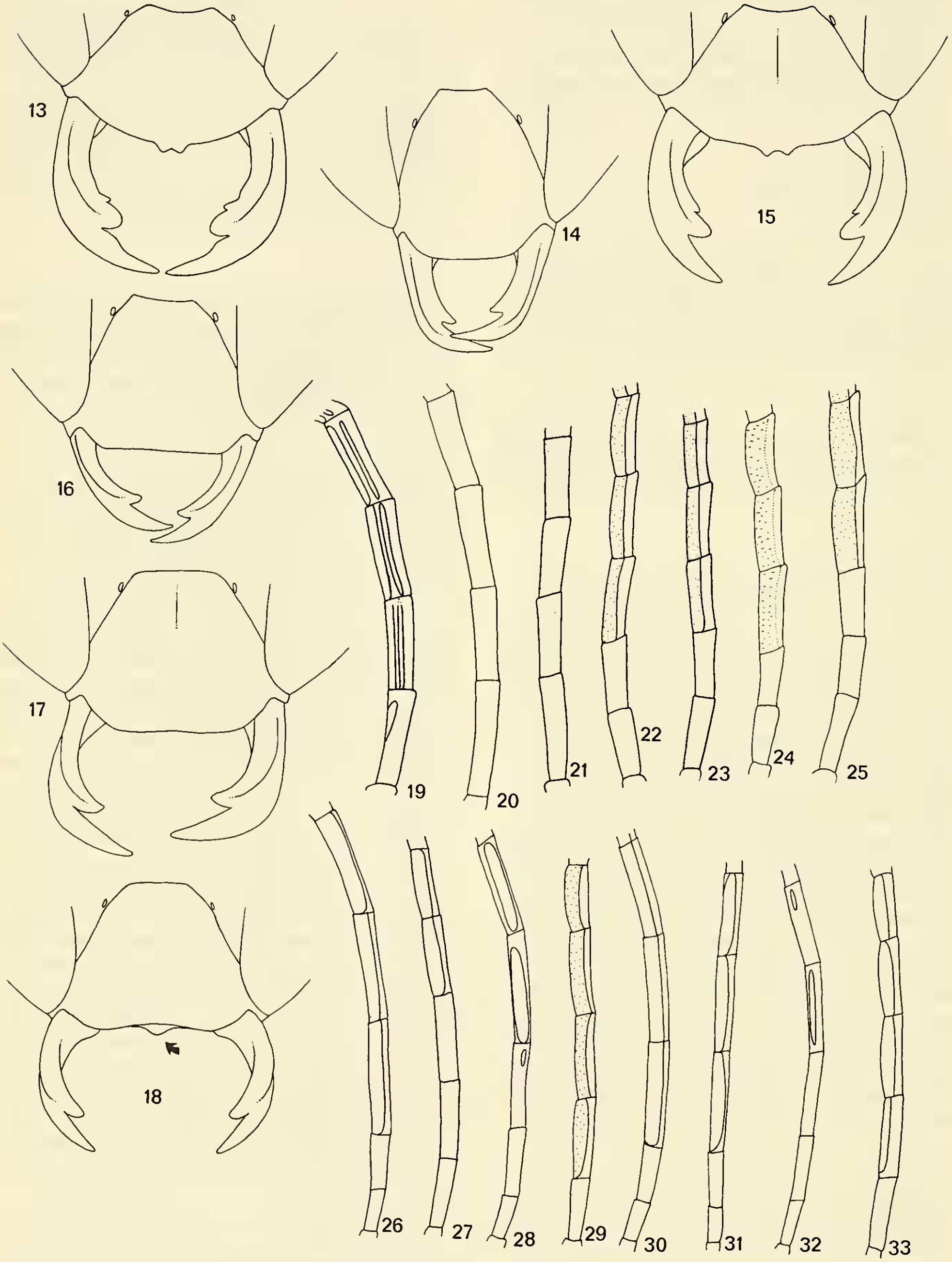
Type material. – Holotype ♀, 'Indonesia, N. Sulawesi, 100 m, Tangkoko-Dua Saudara N. R., 1°30' N, 125°10' E, 28.XI.1985, C. v. Achterberg, RMNH'86' (RMNH). – Paratypes: Indonesia, Sulawesi: Dumoga-Bone N. P., ca. 220 m, nr. Base Camp Toraut R., 0°34' N, 123°54 E, 10.xi.1985, C. v. Achterberg (1 ♀, RMNH); Kendari, iv.1874, O. Beccari (1 ♀, MCG); North Sulawesi, Toli-Toli, xi-xii.1895, H. Fruhstorfer (2 ♂, IRSN, RMNH); 47 km WSW Kotamobagu, Dumoga Bone N. P., Toraut, 211 m, vi.1985, G. R. Else (2 ♀ 4 ♂, BMNH, RMNH); Mt. Sapoetan, viii.1937, C. T. & B. B. Brues (1 ♀, MCZ).

Diagnosis
Similar to *severini* and *diodon*; the female differs in having the petiole as long as hind basitarsus (longer in *diodon* and *severini*), the male has the placoids restricted to 4th and 5th flagellomere, and the gonostyles differ markedly in shape.

Description
Female. – Body length 15.5-18.5 mm, length of forewing 11.5-13.0 mm. Black; mesoscutum with oily shine; posterior margins of tergites brown. Wings yellowish, with sharply defined dark mark apically. Erect pilosity of head and mesosoma yellow; facial tomentum golden; mesosoma with conspicuous golden tomentum on pronotum, sides of mesoscutum, mesopleuron, metanotum, and sides and declivity of propodeum. Clypeus 1.1 times as long as IOC, without median carina; IOV 1.1 times IOC; relative lengths of flagellomeres I-III 1: 0.8 : 0.9. Mesoscutum densely rather coarsely punctate, punctures on disc 0.5-1 diameter apart; propodeal dorsum shiny, rather coarsely rugose-punctate. Petiole 0.95-1.05 times as long as hind basitarsus.

Male. – Body length 14.5-17.0 mm, length of forewing 10.5-12.0 mm. Like the female, except for the following. Erect pilosity of head and mesosoma white; facial tomentum silvery; mesosoma without conspicuous tomentum. Clypeus with vague median carina; IOV 1.2 times IOC; relative lengths of flagellomeres I-III 1: 1.0 : 1.15; fourth and fifth flagellomere with broad convex sensory area. Mesoscutum sparsely rather coarsely punctate, punctures on disc 1-2 diameters apart. Petiole 1.05 times as long as hind basitarsus; eighth sternite apically angularly emarginate; gonostyle in lateral view strongly constricted in the middle, apically swollen.

Etymology
Cestra is an arbitrary combination of letters, to be treated as a noun in apposition.



Figs. 13-33. 13-18, *Sphex*, clypeus and mandibles. – 13, *muticus*, ♀; 14, *muticus*, ♂; 15, *solomon*, ♀; 16, *solomon*, ♂; 17, *praedator*, ♂; 18, *walshae*, ♂. 19-33. *Isodontia*, proximal flagellomeres. – 19, *aurifrons*, ♀; 20, *pilipes*, ♀; 21, *praslinia*, ♀; 22, *aurifrons*, ♂; 23, *formosicola*, ♂; 24, *pilipes*, ♂; 25, *chrysorrhoea*, ♂; 26, *capillata*, ♂; 27, *cestra*, ♂; 28, *delicata*, ♂; 29, *diodon*, ♂; 30, *egens*, ♂; 31, *immaculata*, ♂; 32, *papua*, ♂; 33, *severini*, ♂.

Isodontia delicata sp. n.
(figs. 8, 28, 49)

Type material. – Holotype ♂, Indonesia, Irian Jaya, Jayapura, vii.1938, L. J. Toxopeus, Neth. Ind.-Amer. New Guinea Exp. 1939-39 (RMNH). – Paratypes: Indonesia: same data as holotype (5 ♂, RMNH, BMNH); same locality, vi.1937 (1 ♂), xii.1936 (2 ♂), W. Stüber (RMNH).

Diagnosis

Similar to *papua* (male, female in both species unknown), with which it shares the combination of extremely short flagellomeres I-III, and long narrow concave placoid on fourth flagellomere; *delicata* however has similar placoids on fifth and sixth flagellomere, and fringes of yellow setosity on the posterior tergites; these traits are lacking in *papua*.

Description

Male. – Body length 13.5-15.5 mm, length of forewing 10.5-11.5 mm. Black; mesoscutum with oily shine; sides of first tergite and posterior margins of other tergites and sternites reddish. Wings slightly yellowish hyaline, apically infuscated. Erect pilosity of head and mesosoma yellow; facial tomentum golden; mesosoma with conspicuous golden tomentum on pronotum, sides of mesoscutum, mesopleuron, sides of propodeum; fourth to eighth sternite with fringes of yellow setosity. Clypeus 1.0 times as long as IOC, with vague median carina; IOV 1.0 times IOC; relative lengths of flagellomeres I-III 1: 1.5 : 2.1; third flagellomere with small apical placoid, fourth to sixth with narrow concave placoid. Mesoscutum densely rather coarsely punctate, punctures on disc 0.5-1 diameter apart; propodeal dorsum shiny, anteriorly transversely strigose, posteriorly punctate-strigose. Petiole 1.2-1.3 times as long as hind basitarsus; eighth sternite truncate; gonostyle simple.

Etymology

Delicata is an adjective, from Latin *delicatus* = delicate.

Isodontia diodon (Kohl)
(figs. 29, 50)

Sphex (Isodontia) diodon Kohl, 1890: 377. Lectotype ♂ (present designation): 'Celebes, Sumatra' (NMW!!)
Sphex maia Bingham, 1894: 379. Syntypes, ♂, ♀: Burma, Tenasserim (BMNH!!).

Distribution. – This species occurs on the Asian continent, from Nepal to China and Peninsular Malaysia.

Notes. – 1. The lectotype of *Sphex diodon* Kohl is a male, labelled 'Stevens, 860', '*diodon* typ, det Kohl' (NMW). Kohl gave as the habitat of the species 'Celebes, Sumatra', but this is almost certainly incorrect. The species that corresponds to both the type and the description is found only on the Asian continent.

2. *I. diodon* has been regarded as a polytypic species by past workers (Van der Vecht 1957, Bohart & Menke 1976). However, typical *I. diodon* differs in several morphological aspects from the forms associated with it in the past. *I. nigelloides* (Strand) is a distinct species. Three other forms are treated here as belonging to *I. severini* (Kohl). The three species are allopatric: *I. nigelloides* [**stat. n.**] is restricted to Southern India and Sri Lanka; *I. diodon* occurs on the Asiatic mainland from Nepal to China and Malaysia, whereas *I. severini* occurs in the Archipelago.

Isodontia egens (Kohl)
(figs. 30, 51)

Sphex (Isodontia) egens Kohl, 1898: 335. Holotype ♂: New Britain, Kinigunang (TMB!!).

Distribution. – New Britain, Western New Guinea, Biak.

Isodontia franzi (Cameron)

Sphex (Isodontia) franzi Cameron, 1902: 246. Holotype ♂: Borneo (BMNH!!).

Distribution. – Only the type specimen from Borneo is known.

Isodontia immaculata sp. n.
(figs. 31, 52)

Type material. – Holotype ♂, Papua New Guinea, New Ireland, Trail to Lelet, Plateau near Danum, 15.xii.1969, J. E. Tobler (CAS). – Paratypes: Papua New Guinea: same data as holotype (2 ♂, CAS, RMNH); Lavongai [New Hanover], Banatam, 24.iii.1962, Noona Dan Exp. (1 ♀, UZMC).

Diagnosis

Within the *diodon*-group, this species is the least tomentose one: the facial tomentum is very sparse and silvery, the mesosoma lacks tomentum, whereas all other species have conspicuous spots of silvery or golden tomentum on pronotal lobes, angles of propodeum, etc. Structurally, the species is similar to *egens* and *permutans*, males of these species share the combination of extremely short proximal flagellomeres, and broad flat placoids on third to sixth flagellomere; *immaculata* differs markedly in the shape of the male gonostyle.

Description

Female. – Body length 17.5 mm, length of forewing 12.5 mm. Black. Wings clear, forewing anteriorly and apically infuscate, the dark mark not sharply delimited. Erect pilosity of head and mesosoma white; facial tomentum silvery, sparse; mesosoma without tomentum. Clypeus 1.1 times as long as IOC, without median carina; IOV 1.0 times IOC; relative lengths of flagellomeres I-III 1: 0.95 : 1.0. Mesoscutum densely rather coarsely punctate, punctures on disc 0.5-1 diameter apart; propodeal dorsum shiny, rather coarsely rugose-punctate. Petiole 1.1 times as long as hind basitarsus.

Male. – Body length 16.0 mm, length of forewing 11.5 mm.

Like the female except for the following. Clypeus 1.1 times as long as IOC, with vague median carina; relative lengths of flagellomeres I-III 1 : 1.4 : 2.4 ; third to sixth flagellomere with broad flat sensory area. Mesoscutum densely rather coarsely punctate, punctures on disc 1-1.5 diameters apart; propodeal dorsum shiny, rather coarsely rugose-punctate. Petiole 1.1 times as long as hind basitarsus; eighth sternite apically not emarginate; gonostyle apicodorsally swollen and rounded.

Etymology

Immaculata is an adjective, from Latin *immaculatus* = immaculate.

Isodontia papua sp. n.

(figs. 32, 53)

Type material. – Holotype ♂, Indonesia, New Guinea, 'Neth. Ind.-American New Guinea Exped., Araucaria Camp, 800 m, 30.III.1939, L. J. Toxopeus' (RMNH).

Diagnosis

Similar to *delicata* (male, female of both species unknown), with which it shares the combination of extremely short proximal flagellomeres, and a long narrow, concave placoid on the fourth flagellomere. However, *delicata* has similar placoids on fifth and sixth flagellomere, whereas *papua* only has a vestigial one on fifth, and none on sixth. Additionally, *papua* lacks fringes of yellow setosity on the sternites, as found in *delicata*.

Description

Male. – Body length 15.0 mm, length of forewing 11.5 mm. Black; mesoscutum with oily shine; posterior margins of tergites and sternites reddish to yellow. Wings light brownish hyaline, apically infuscated. Erect pilosity of head and mesosoma yellow; facial tomentum silvery; mesosoma with conspicuous golden tomentum on pronotum, sides of mesoscutum, mesopleuron, etc.; posterior tergites with appressed pale yellow pilosity. Clypeus 1.0 times as long as IOC, with vague median carina; IOV 1.1 times IOC; relative lengths of flagellomeres I-III 1: 1.45 : 2.0; fourth flagellomere with long, narrow, concave placoid, fifth with small apical placoid. Mesoscutum densely rather coarsely punctate, punctures on disc 0.5-1 diameter apart; propodeal dorsum shiny, anteriorly transversely punctate-strigose, posteriorly reticulate-punctate. Petiole 1.2 times as long as hind basitarsus; sixth to eighth sternite with scattered pilosity posteriorly, without real fringes; eighth sternite truncate; gonostyle simple.

Etymology

Papua is noun in apposition, it is the common name for the native inhabitants of New Guinea.

Isodontia permutans (Turner)

(fig. 54)

Sphex permutans Turner, 1912: 198. Lectotype ♀ (present designation): New Guinea, Wataikwa River (BMNH!!)

Distribution. – New Guinea, Solomon Islands.

Notes. – 1. The males of *permutans* and its closest relatives are all easily recognized using characters of the genitalia and secondary sexual characters. The females of *permutans*, *papua*, *delicata*, and *capillata* are apparently inseparable. As the type of *permutans* is a female, the identity of this species is uncertain. I have associated the most common and widely distributed type of male with *permutans*, and described the others as new species. I have not been able to associate females with these. If characters are eventually found to identify females of these species, my interpretations may need revision.

2. *I. permutans* is geographically variable with respect to the colour of pilosity and tomentum. Typically (New Guinea) the pilosity is pale yellow, the tomentum golden. Specimens from Bougainville are similar to the typical form. The pilosity of head and mesosomal dorsum is partly to entirely dark in specimens from the other Solomon Islands. The tomentum is silvery in specimens from Gizo, Kolombangara, San Cristobal, and Malaita.

Isodontia severini (Kohl) stat. rev.

(figs. 33, 55)

Sphex (Isodontia) severini Kohl, 1898: 337, ♀. – Java (IRSN).

Sphex malayanus Cameron, 1902: 134. Lectotype ♂ (present designation): Borneo, Kuching (BMNH!!)

Sphex (Isodontia) severini var. *philippensis* Rohwer, 1921: 669. Holotype ♀: Palawan (USNM!!).

Isodontia diodon alemon Vecht, 1957: 367. ♂: Sumba (NMB) Syn. n.

Distribution. – Malaysia, Singapore, Indonesia (Sumatra, Java, Borneo, Sumba, Halmaheira), Philippines.

Group of *Isodontia ochroptera*

Diagnosis

Body length ♂ 16-22 mm, ♀ 20-22 mm. Labrum of female with median carina; mandible in both sexes tridentate, basal inner tooth in male strongly developed, projecting beyond second inner tooth; clypeus of female with pair of apical teeth medially; first flagellomere in female distinctly longer than second, in male first and second flagellomere equally long; third to eighth flagellomere of male with broad, convex, papillate sensory areas; antenna of female without sensory areas; outer side of hind tibia with five spines; petiole a little shorter than hind basitarsus.

Species included

Species treated. – *I. ochroptera* (Kohl).

Other included species. – *I. sonani* (Tsuneki) from Taiwan.

Isodontia ochroptera (Kohl)

(figs. 9-10, 34)

Sphex (Isodontia) ochropterus Kohl, 1890: 378. ♀: Indonesia, Sulawesi, Bantimurung (Mus. Dresden, probably destroyed).

Distribution. – Continental Asia from Eastern India to Laos and Malaysia, Indonesia (Sumatra, Borneo, Java, Sulawesi, Aru, Halmaheira), Philippines (Palawan, Samar)

Group of *Isodontia praslinia*

Diagnosis

Body length ♂ 15-23 mm, ♀ 16-23 mm. Labrum of female with a pair of short, parallel, projecting carinae apically; mandible of both sexes tridentate, basal inner tooth strongly developed, projecting beyond second inner tooth; clypeus of female with median notch; first flagellomere longer than second; flagellum of male with generally with flat placoids on flagellomeres IV-VI; antenna of female without sensory areas. Scutellum and metanotum convex; propodeal dorsum more or less reticulate; outer side of hind tibia with 5-10 spines. Petiole usually shorter than hind basitarsus.

Species included

Species treated. – *I. elsei* sp. n., *jaculator* (Smith), *nidulans* sp. n., *praslinia* (Guérin-Méneville), *sepicola* (Smith).

Other included species. – *I. obscurella* (Smith) from Australia, *I. xanthognatha* (Pérez) (= *nigella* (Smith), nec Lichtenstein) [stat. n.] from continental Asia.

Key to species

1. Pilosity of head and mesosoma dark brown to black; wings dark brown with violaceous shine; Timor (?), New Guinea and neighbouring islands .... *praslinia* (Guérin-Méneville)
– Erect pilosity of head and mesosoma white to yellowish; colour of wings variable 2
2. Propodeal dorsum sparsely punctate, interspaces smooth, shiny; interocular distance across vertex shorter than across clypeus; Philippines .... *nidulans* sp. n.
– Propodeal dorsum punctate-reticulate to strigose-punctate, more or less dull, without smooth interspaces 3
3. Facial tomentum sparse, silvery, sculpture of clypeus easily visible; Moluccas .... *jaculator* (Smith)
– Facial tomentum dense, golden or silvery, sculpture of clypeus largely obscured 4
4. Petiole of female 0.8-0.95, of male 0.9-1.0 times as long as hind basitarsus; IOV 0.85-1.05 times IOC; male: mandibles entirely bright reddish; New Guinea and neighbouring islands, Northern Australia .... *sepicola* (Smith)
– Petiole of female 0.95, of male 1.05-1.1 times as long as hind basitarsus; IOV 1.1 times IOC; male: basal third of mandibles black; Sulawesi .... *elsei* sp. n.

Isodontia elsei sp. n.

(fig. 35)

Type material. – Holotype ♂, Indonesia, Sulawesi, 'Rosenberg, Toelabella, Celebes' (RMNH). – Paratypes. Indonesia, Sulawesi: Gorontalo (1 ♂), Kwadang (1 ♂), both Rosenberg (RMNH); Patunuang, i.1896, H. Frühstorfer (2 ♀, RMNH); 47 km WSW Kotamobagu, Dumoga Bone N. Pk., Toraut (Forest Edge), 211 m, v-vi.1985, G. R. Else (6 ♂, 3 ♀, BMNH, RMNH); Luwuk, Matanyo Forest, N. of Kayutano, 120 m, 20.x.1989, C. van Achterberg & M. Tulung (1 ♀, RMNH).

Diagnosis

Very similar to *sepicola*, from which it differs only in the characters mentioned in the key.

Description

Female. – Body length 19.0-20.5 mm; length of forewing 13.5-15.5 mm. Black; mesoscutum with oily shine. Wings light brownish, apical margins more strongly infuscated, with violaceous shine. Erect pilosity of head and mesosoma nearly white; facial tomentum golden, dense, leaving sculpture of clypeus visible under a certain angle only; mesosoma without conspicuous tomentum. Clypeus 0.8 times as long as IOC, without discernable median carina; IOV 1.1 times IOC; relative length of flagellomeres I-III 1 : 0.8 : 0.8. Mesoscutum shiny, sparsely finely punctate, punctures on disc 1-3 diameters apart; propodeal dorsum more shiny than in *I. sepicola*, weakly transversely rugose and shallowly punctate. Petiole 0.95 times as long as hind basitarsus.

Male. – Body length 15.5-20.5 mm; length of forewing 13.5-15.5 mm. Like the female except for the following. Black; mandibles with short reddish zone just before apex. Wings brownish hyaline, apical margins infuscated. Erect pilosity of head and mesosoma yellowish to white. Clypeus 0.85 times as long as IOC; relative length of flagellomeres I-III 1 : 0.8 : 0.85. Petiole 1.05-1.1 times as long as hind basitarsus; third to seventh sternite with fringes of brown setosity; gonostyle simple.

Etymology

Elsei is a noun in the genitive case, referring to Mr. George R. Else, collector of most of the type series, and many other interesting Sulawesi wasps.

Isodontia jaculator (Smith)
(fig. 36)

Sphex jaculator Smith, 1860: 122. Holotype ♂: Indonesia, Bacan (OUM!!).

Distribution. – Exclusively known from the island Bacan, in the Indonesian Northern Moluccas.

Isodontia nidulans sp. n.

Type material. – Holotype ♀, Philippines, Luzon, 'Olongapa, P. I., Subic Bay, V.1967', 'Coll. by J. C. Thomson' (USNM).

Diagnosis

Immediately separated from other species of this group by its very fine sculpture; in particular the propodeal dorsum is smooth, shiny, with sparse fine punctuation.

Description

Female. – Body length 20.0 mm; length of forewing 15.5 mm. Black; mesoscutum with oily shine. Wings brown, with violaceous shine. Erect pilosity of head and mesosoma white; facial tomentum silvery, sparse; mesosoma without conspicuous tomentum. Clypeus 0.7 times as long as IOC, with blunt median carina on dorsal half; IOV 0.95 times IOC; relative length of flagellomeres I-III 1 : 0.75 : 0.75. Mesoscutum shiny, obsoletely punctate; propodeal dorsum shiny, along anterior margin with weak rugae, remaining part smooth, finely, shallowly punctate. Petiole 0.9 times as long as hind basitarsus.

Etymology

Nidulans is an adjective based on the Latin verb *nidulare* = to shine.

Isodontia praslinia (Guérin-Méneville)
(figs. 11-12, 21, 37)

Sphex praslinius Guérin-Méneville, 1831: pl. 8. Holotype ♀: New Ireland, Pt. Praslin (MCG!).
Sphex (Isodontia) ustulata Kohl, 1890: 378. Holotype ♀: Timor (NMW!!). Syn. n.
Sphex (Isodontia) simplex Kohl, 1898: 334. Lectotype ♂ (present designation): New Guinea: Erima, Astrolabe-Bay (TMB!!). Syn. n.
Sphex (Isodontia) insularis Cameron, 1901: 240. Holotype ♂: New Britain (BMNH!!). Syn. n.

Distribution. – This species occurs on New Guinea and neighbouring islands: New Britain, New Ireland, Misool Island, the Solomon Islands. The record from Timor is based only on the type of *ustulata*, and it is doubtful whether the species indeed occurs there. Species whose occurrence is centered on the Papuan subregion, like *I. praslinia*, and also for example *I. sepicola* and *S. cognatus* rarely occur in the Lesser Sunda islands. The two areas are climatically quite different.

Isodontia sepicola (Smith)
(fig. 38)

Sphex sepicola Smith, 1859: 158. Lectotype ♀ (present designation): Aru (OUM!!)
Sphex albohirtus Turner, 1908: 466. Lectotype ♀ (present designation): Australia: Mackay (BMNH!!). Syn. n.

Distribution. – This species occurs on New Guinea, and neighbouring islands: Aru islands, Solomon islands, Misoöl, and in Australia, where it seems to be restricted to Northern Queensland.

Genus *Sphex* Linnaeus

Group of *Sphex argentatus*

Diagnosis

Body length ♂ 20-28 mm, ♀ 23-34 mm. Mandible of both female and male bidentate; antenna of male with placoid(s), at least on fifth flagellomere; scutellum convex, medially impressed; metanotum medially raised into a pair of tubercles, or into a single medially impressed tubercle; claw teeth large, at sharp angle to claw.

Species included

Species treated. – *S. alacer* Kohl, *argentatus* Fabricius, *diabolicus* Smith, *finschii* Kohl, *madasummae* Van der Vecht, *sericeus* Fabricius

Other included species. – *carbonicolor* Vecht, *decoratus* Smith, *ephippium* Smith, *modestus* Smith (all Australian), *fumicatus* Christ (Africa to SW. India and Sri Lanka).

Key to species

1. Propodeal dorsum with 4-6 transverse ridges 2
– Propodeal dorsum without ridges 3
2. Female: apical margin of clypeus with median tooth; male: 2nd to 6th flagellomere with broad placoid (fig. 39); New Guinea.. *alacer* Kohl
– Female: apical margin of clypeus without tooth; male: 3rd or 4th to 6th flagellomere with placoid (fig. 42); Sri Lanka to New Guinea .... *sericeus* (Fabricius)
3. Wings uniformly dark brown, with violaceous effulgence; Burma to New Guinea, Philippines .... *madasummae* Van der Vecht
– Wings clear or yellowish, only at basis and apex sometimes darkened 4
4. Wings strongly yellowish to yellow-brown; Sri lanka to Sulawesi .... *diabolicus* Smith
– Wings essentially clear, infuscate at base and apex 5
5. Metanotum with single medially impressed tubercle; male: 4th to 6th flagellomere with broad placoids (fig. 41); Moluccas, New Guinea, Solomon Islands, Australia *finschi* Kohl
– Metanotum strongly bituberculate; male: only 5th flagellomere with narrow placoid (fig. 40); widespread................ *argentatus* Fabricius

Sphex alacer Kohl
(fig. 39)

Sphex alacer Kohl, 1895: 54. Holotype ♀: New Guinea (NMW!).

Distribution. – New Guinea, New Ireland.

Sphex argentatus Fabricius
(fig. 40)

Sphex argentatus Fabricius, 1787: 274. Lectotype ♀ (designated by Van der Vecht 1961: 28): India, Coromandel (Mus. Lund!).
Sphex umbrosus Christ, 1791: 293, pl. 29. No locality given [type lost].
Sphex argenteus Turton, 1800: 485. India, Coromandel [possible emendation].
Sphex argentifrons Lepeletier, 1845: 337. Lectotype ♂ (designated by Menke in Bohart & Menke 1975: 114): Java (Mus. Torino!).
Sphex plumifer Costa, 1864: 112. Philippines, Luzon (Mus. Naples).
Sphex umbrosus var. *nanulus* Strand, 1913: 83. Holotype ♀: Taiwan, Taihorin (DEI!!).
Sphex umbrosus var. *fumosus* Kohl, 1890: 408. Japan (TMB).

Distribution. – Sri Lanka and India to Indochina and Japan; Malaysia, Indonesia, Philippines, Papua New Guinea and NE. Australia.

Note. – *Sphex unicolor* Fabricius, 1787, listed as a synonym of *argentatus* by Bohart & Menke (1975), was described from Spain where *argentatus* does not occur. Van der Vecht (1961) suggested that the name might refer to *S. fumicatus* Christ, 1791, but that species has never been reported from Spain either. The only Spanish species of *Sphex* that agrees with the description is *S. afer* Lepeletier. Alternatively, the locality may be incorrect.

Sphex diabolicus Smith

Sphex diabolicus Smith, 1858: 100. Lectotype ♀ (designated by Van der Vecht 1973): Sarawak (OUM!)
Sphex flammitrichus Strand, 1913: 83. Lectotype ♀ (present designation): Taiwan (DEI!!)
Sphex umbrosus var. *aureopilosus* Berland, 1928: 330. Lectotype ♂ (designated by Menke in Bohart & Menke 1975): Ba-Cha, Tonkin (MNHN!!)
Sphex fulvohirtus Bingham, 1890: 242. Holotype ♀: Sri Lanka, Pundalaya (BMNH!!). Syn. n.

Types. – The lectotype of *Sphex flammitrichus* is a female labelled 'Kankau (Koshun), Formosa, H. Sauter, vii.1912', the paralectotypes are 3 males, labelled 'Korosan, Formosa, Sauter, xi.07' (all DEI).

Distribution. – India and Sri Lanka to Malaysia, Indonesia (Sumatra and neighbouring islands, W. Java, Borneo, Sulawesi), Philippines.

Sphex finschii Kohl
(fig. 41)

Sphex finschii Kohl, 1890: 412. Lectotype ♂ (present designation): New Britain (ZMB!!)

Distribution. – Indonesia (Ambon, Aru Islands, Irian Jaya), Papua New Guinea, Bismarck Islands, Solomon Islands, Australia.

Sphex madasummae Van der Vecht

Sphex caerulescens Guillou, 1841: 320. Holotype ♀: Borneo (MNHN!!) [non Reich, 1795].
Sphex maurus Smith, 1856: 255. Syntypes, ♀, ♂: Sulawesi (BMNH!!) [non Fabricius, 1787].
Sphex nigerrimus Costa, 1864: 112. Philippines, Luzon (Naples Museum?) [non Scopoli, 1763].
Sphex madasummae Van der Vecht, 1973: 345 [new name for *Sphex maurus* Smith].

Distribution. – Malaysia, Indonesia (not known from Nusa Tenggara); Philippines, Papua New Guinea.

Sphex sericeus Fabricius
(fig. 42)

Sphex aurulentus Fabricius, 1793: 201. – India, Tranquebar (location of type unknown) [non Fabricius, 1787].
Sphex sericeus Fabricius, 1804: 211. Lectotype ♀ (designated by Van der Vecht 1961): 'in maris pacifici Insulis' (Mus. Lund!)
Sphex fabricii Dahlbom, 1843: 27. ♀: India, Tranquebar (location of type unknown).
Sphex ferrugineus Lepeletier, 1845: 345. ♀: 'sans patrie, mais exotique' (MNHN?).
Sphex lineolus Lepeletier, 1845: 353. ♂: Java (MNHN?) [locality probably erroneous].
Sphex ferox Smith, 1862: 55. Syntypes, ♀, ♂: Ambon, Sulawesi (BMNH!!, OUM) [non Westwood, 1837].
Sphex lepeletierii Saussure, 1867: 40. Holotype ♀: Java (NMW!!) [locality probably erroneous].
Sphex godeffroyi Saussure, 1869: 57. ♀: Australia, Queensland, Cape York (Mus. Hamburg).
Sphex aurifex Smith, 1873: 460, pl. xliv, fig. 3. Holotype ♀: NW. Australia, Champion Bay (BMNH!!).
Sphex aurulentus var. *pallidehirtus* Kohl, 1890: 393. Syntypes ♂: New Guinea: Port Moresby; Ambon (NMW?).
Sphex rugosus Matsumura, 1912: 176, 53, fig. 8. ♀: Taiwan: Horisha, Koshun.
Sphex sericeus ferocior Van der Vecht & Krombein, 1955: 40 [new name for *Sphex ferox* Smith].
Sphex sericeus nigrescens Van der Vecht & Krombein, 1955: 39. Holotype ♀: Philippines, Luzon, Los Baños (USNM).
Sphex sericeus stueberi Van der Vecht & Krombein, 1955: 42. Holotype ♀: Indonesia, Irian Jaya, Jayapura (RMNH!!).
Sphex sericeus wegneri Van der Vecht & Krombein, 1955: 39. Holotype ♂: Indonesia, Kalimantan, Samarinda, Mura Kaman (RMNH!!).

Distribution. – India and Sri Lanka to China and Indochina, Malaysia, Indonesia, Philippines, Papua New Guinea, N. Australia.

Note. – This species occurs in many colourforms, which are largely allopatric. Van der Vecht and Krombein (1955) recognized eight subspecies.

Group of *Sphex resplendens* Smith

Diagnosis

Body length ♂ 17-24 mm, ♀ 20-33 mm. Mandible of both female and male bidentate; antenna of male without placoids; scutellum of female flat or very weakly convex, conspicuously shiny, of male convex, medially not or hardly impressed; claw teeth small, perpendicular to claw.

Species included

Species treated. – *S. brachystomus* Kohl, *confrater* Kohl, *dorycus* Guérin-Méneville, *mimulus* Turner, *muticus* Kohl, *resplendens* Kohl, *solomon* sp. n., *wilsoni* sp. n.

Other included species. – *S. fumipennis* Smith, *S. gilberti* Turner, *S. luctuosus* Smith (all from Australia), and *S. antennatus* Smith **stat. n.** (from New Caledonia, New Hebrides and Loyalty Islands; listed as a subspecies of *S. fumipennis* by Bohart & Menke 1976).

Key to species

1. Metasoma partly red (sometimes only part of posterior tergites) 2
– Metasoma entirely black 4
2. Pilosity of mesosoma white; 8th sternite of male with narrow apical process; Australia, New Guinea .... *mimulus* Turner
– Pilosity of mesosoma dorsally yellow to black, ventrally brownish to black; 8th sternite of male triangular, without process 3
3. Metasoma except petiole entirely red; pilosity of mesosoma dorsally yellow to brownish; petiole of female longer than wide; gonostyles of male without inner lobe; New Guinea .... *dorycus* Guérin-Méneville
– Metasoma with only posterior tergites and sternites red; pilosity of mesosoma black; petiole of female as long as wide; gonostyles of male ventrally with flat, almost circular inner lobe (fig. 56); Solomon and Bismarck Islands .... *confrater* Kohl
4. Mesonotum densely covered with silvery or golden tomentum, completely obscuring sculpture 5
– Mesonotum without or with sparse tomentum, sculpture visible throughout 6
5. Tomentum golden; wings yellowish, apical margins infuscate; New Guinea .... *wilsoni* sp. n.
– Tomentum silvery; wings dark brown, with violaceous effulgence; New Guinea, Bismarck Islands..................... *brachystomus* Kohl
6. Females 7
– Males 9
7. Mandibles long, strongly curved (fig. 13),

when closed reaching beyond base of opposite mandible; apical margin of clypeus strongly arcuate; median carina of labrum projecting into a small apical tooth; Buru, Ambon .... *muticus* Kohl
- Mandibles short, moderately curved (fig. 15), when closed not reaching base of opposite mandible; anterior margin of clypeus weakly arcuate; median carina of labrum not projecting apically 8

8. Interocular distance at vertex longer than combined lengths of flagellomeres II + III; metanotum without silvery tomentum; Moluccas, New Guinea, Philippines, Australia .... *resplendens* Kohl
- Interocular distance at vertex equal to combined lengths of flagellomeres II + III; metanotum densely covered with silvery tomentum; Solomon Islands .... *solomon* sp. n.

9. Mandibles with basal half straight, sharply curved inward distally (fig. 14); petiole in dorsal view more than 2 times as long as wide; gonostyles not emarginate, the apex simple; Buru, Ambon .... *muticus* Kohl
- Mandibles smoothly curved, approximately a quarter-circle (fig. 16); petiole in dorsal view less than 2 times as long as wide; gonostyles dorsally emarginate, the apex produced into tooth pointing upward (fig. 58) 10

10. Pilosity of head and mesosoma dark brown to black; wings dark brown; Philippines, Moluccas, New Guinea, Australia .... *resplendens* Kohl
- Pilosity of head and mesosoma yellowish, partly dark brown on head and mesosomal dorsum; wings brownish hyaline; Solomon Islands .... *solomon* sp. n.

Sphex brachystomus Kohl

Sphex brachystomus Kohl, 1890: 415. Syntypes ♀ ♂: New Britain (NMW!).

Distribution. – Papua New Guinea, Bismarck Islands (New Ireland, New Britain).

Sphex confrater Kohl
(fig. 56)

Sphex confrater Kohl, 1890: 414. Syntypes ♀: New Britain ('Mus. Hammon').
? *Sphex confrater* var. *sieberti* Strand, 1910: 46. Syntypes ♀: Java, Batavia (location of types unknown).

Distribution. – Solomon Islands (Kolombangara, Guadalcanal), Papua New Guinea, Bismarck Islands (New Britain, New Ireland).

Note. – Judging on the type-locality, it seems very unlikely that *sieberti* Strand is indeed a variety of *confrater*, but it is not clear from the description to which other species it might pertain.

Sphex dorycus Guérin-Méneville

Sphex dorycus Guérin-Méneville, 1838: 262. Holotype ♀: New Guinea, Manokwari ('Dory') (MCG).
Sphex errabundus Kohl, 1898: 338. Holotype ♀: Indonesia, Waigeo ('Waigiu') (TMB!).

Distribution. – Indonesia (Waigeo, Irian Jaya), Papua New Guinea.

Note. – The synonymy of this species was discussed by Van der Vecht (1973).

Sphex mimulus Turner

Sphex mimulus Turner, 1910b: 419. Holotype ♀: Australia, Queensland, Cairns (BMNH!).

Distribution. – Australia (Queensland), S. Papua New Guinea.

Sphex muticus Kohl
(figs. 13-14, 57)

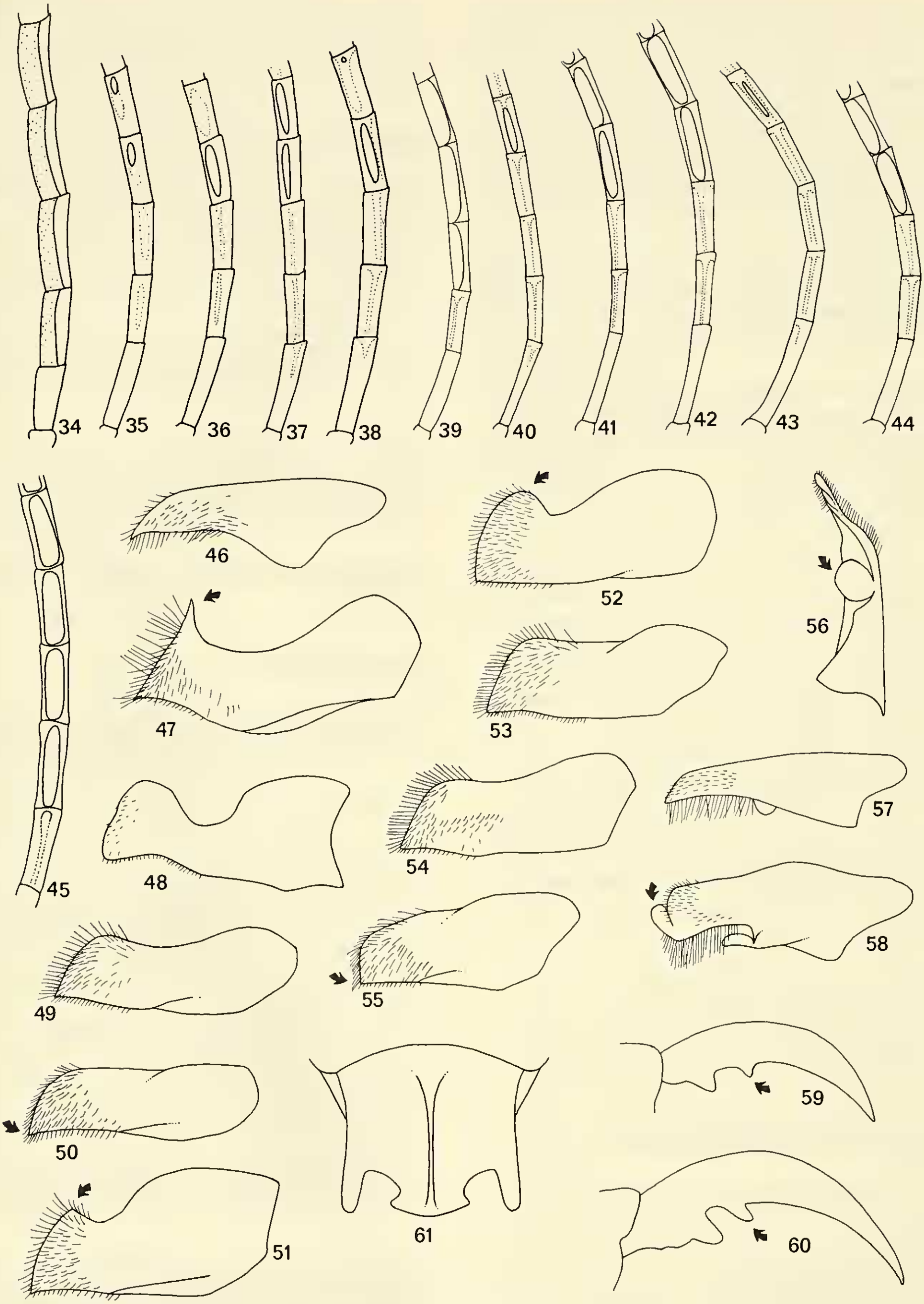
Sphex muticus Kohl, 1885: 199. Lectotype ♂ (designated by Van der Vecht 1973): Indonesia, Ambon (NMW!)

Distribution. – Indonesia (Buru, Ambon).

Sphex resplendens Kohl

Sphex nitidiventris Smith, 1859: 158. Holotype ♀: Indonesia, Buru (OUM!) [non Spinola, 1851].
Sphex gratiosus Smith, 1859: 158. Holotype ♂: Indonesia, Aru Islands (OUM!) [non Smith, 1856].
Sphex resplendens Kohl, 1885: 200 [new name for *S. nitidiventris* Smith].
Sphex gratiosissimus Dalla Torre, 1897: 424 [new name for *S. gratiosus* Smith, 1859].
Sphex wallacei Turner, 1908: 467 [new name for *S. nitidiventris* Smith].
Sphex lanceiventris Vachal, 1908: 23 [new name for *S. nitidiventris* Smith].
Sphex mertoni Strand, 1911: 231. Holotype ♀: Indonesia, Aru Islands, Kobroör, Seltutti (Mus. Senckenberg!!).

Distribution. – Philippines (Negros, Luzon); Indonesia (Aru Islands, Key Islands, Bacan, Ambon, Irian Jaya); Papua New Guinea, Australia (Queensland). A few specimens from Bangka in the RMNH are probably incorrectly labelled.



Figs. 34-61. *Isodontia* and *Sphex*. 34-45, proximal flagellomeres of ♂. – 34, *I. ochroptera*; 35, *I. elsei*; 36, *I. jaculator*; 37, *I. praslinia*; 38, *I. sepicola*; 39, *S. alacer*; 40, *S. argentatus*; 41, *S. finschi*; 42, *S. sericeus*; 43, *S. rex*; 44, *S. subtruncatus*; 45, *S. walshae*. 46-58. Gonostyle of ♂, 46-55 + 57-58, lateral view, 56, ventral view. – 46, *I. pilipes*; 47, *I. capillata*; 48, *I. cestra*; 49, *I. delicata*; 50, *I. diodon*; 51, *I. egens*; 52, *I. immaculata*; 53, *I. papua*; 54, *I. permutans*; 55, *I. severini*; 56, *S. confrater*; 57, *S. muticus*; 58, *S. solomon*. 59-60, tarsal claw. 59, *S. solomon*, ♀; 60, *S. subtruncatus*, ♀. 61, *S. rex*, ♂, eighth sternite.

Sphex solomon sp. n.
(figs. 15-16, 58-59)

Type material. – Holotype ♂, Solomon Islands, Guadalcanal Is., Lunga, 2.xii.1934, H. T. Pagden (RMNH). – Paratypes: Solomon Islands: Tulagi (3 ♀), Guadalcanal, Lunga (1 ♀ 1 ♂), Ganonga (1 ♀ 5 ♂), Nygela (1 ♀), all H. T. Pagden (RMNH); Guadalcanal, Kukum, P. Greenslade (1 ♀, BMNH); Isabel, Tatamba (1 ♀, Australian National Insect Collection, Canberra; 1 ♀, RMNH); Bougainville, Buin, G. Daniels (1 ♀, Australian Museum, Sydney); Guadalcanal, Lunga River Bridge, J. Schenk (1 ♂, Los Angeles County Museum); Guadalcanal, Kukum, E. S. Brown (1 ♂ 7 ♀, BMNH, 2 ♀, RMNH).

Diagnosis

Similar to *resplendens* and *brachystomus*, with which *solomon* shares relatively short and weakly curved mandibles, and an apical lobe on the male gonostyle. It differs from these species in vestiture: the silvery tomentum of the mesosoma is restricted to the pro- and metanotum, particularly conspicuous on the latter, in male, the pilosity of head and mesosoma is basically pale. Structural features are: in female, IOV equals flagellomere 2 + 3 (longer in *resplendens* and *brachystomus*); in male the apical lobe of the gonostyle is broad and rounded (narrow, pointed in the other species).

Description

Female. – Body length 20-25 mm; length of forewing 15.0-18.5 mm. Black, metasoma with fine greenish metallic shine. Wings brown. Pilosity of head and mesosoma dark brown; facial tomentum brownish to silvery; mesosoma with conspicuous silvery tomentum on metanotum and sometimes on pronotum. Clypeus 0.8 times as long as IOC, with weak median keel on dorsal half, apical margin slightly raised, with a pair of short teeth medially; IOV 0.75 times IOC; labrum with median carina, which does not project apically; relative lengths of flagellomeres I-III 1 : 0.6 : 0.6. Mesopleuron sparsely finely punctate, interspaces punctulate, shiny; mesoscutum densely, rather coarsely punctate, punctures 0.5-1 diameter apart, interspaces smooth, shiny; scutellum slightly convex, sparsely finely punctate, shiny; propodeum coriaceous, dull. Fore basitarsus with 8 rake spines, median spines 2 times tarsal width, apical spine as long as second tarsomere. Petiole 0.3 times as long as hind basitarsus, in dorsal view hardly longer than wide.

Male. – Body length 19-24 mm; length of forewing 13.5-17.0 mm. Like the female except for the following. Wings brownish hyaline, apical margins infuscate. Facial tomentum silvery; pilosity of head and mesosoma basically pale, more or less mixed with dark hairs or entirely dark on vertex, temples and mesosomal dorsum. Clypeus 0.95 times as long as IOC, apical margin untoothed, medially depressed; IOV 0.85 times IOC; labrum ecarinate; scutellum convex, faintly impressed along midline. Apical margins of second to seventh sternite with row of black setae; eighth sternite apically produced into a tooth, distal third medially keeled; gonostyle apically with short lobe pointing upward, ventrally in the middle with almost circular lobe pointing inward.

Etymology

Solomon is a noun in apposition, referring to the type locality.

Sphex wilsoni sp. n.

Type material. – Holotype ♀, Papua New Guinea, Huon Peninsula, Mongi-Mape Watersheds, Nganduo to Yunzain, 1000-1500 m, 56.iv.1955, E. O. Wilson (MCZ).

Diagnosis

Immediately separated from other species of the *resplendens*-group by the conspicuous golden tomentum on head and thorax, and the yellow wings. Structurally, *wilsoni* is similar to *confrater*, *mimulus*, *dorycus* and *muticus*, with which it shares the long, strongly curved mandibles.

Description

Female. – Body length 25 mm; length of forewing 19 mm. Black; metasoma with fine metallic shine. Wings yellow, apical margins infuscate. Pilosity of head and mesosoma dark brown; head, pro-, meso- and metanotum with dense golden tomentum, completely obscuring the sculpture of these parts. Clypeus 0.75 times as long as IOC, with weak median carina dorsally; apical margin slightly raised, with a pair of short teeth medially; IOV 0.75 times IOC; labrum with median carina, projecting apically into a short tooth; mandibles long, strongly curved, when closed reaching beyond each other's bases (cf. fig. 13); relative length of flagellomeres I-III 1 : 0.6 : 0.65. Mesopleuron sparsely finely punctate, interspaces weakly punctulate; mesonotum apparently (obscured by vestiture) densely finely punctate, shiny; propodeum finely coriaceous, dull; fore basitarsus with 9 rake spines, median spines 1.4 times tarsal width, apical spine shorter than second tarsomere. Petiole 0.25 times as long as hind basitarsus, in dorsal view hardly longer than wide.

Etymology

Wilsoni is a noun in the genitive case, referring to E.O. Wilson, collector of the only known specimen of this species.

Group of *Sphex subtruncatus* Dahlbom

Diagnosis

Body length ♂ 16-28 mm, ♀ 15-36 mm. Mandible of both male and female bidentate; antenna of male with placoid(s); scutellum convex, medially impressed; metanotum simple; claw teeth large, at sharp angle to claw.

Species included

Species treated. – *S. cognatus* Smith, *formosellus* Van der Vecht, *praedator* Smith, *rex* sp. n., *staudingeri* Gribodo, *subtruncatus* Dahlbom, *walshae* sp. n.

Other included species. – *S. obscurus* (Fabricius) (Sri Lanka to Thailand, *ahasverus* Kohl, *semifossulatus* Van der Vecht, *vestitus* Smith, *ermineus* Kohl, and *bilobatus* Kohl (all Australian).

Note. – This is obviously a heterogeneous assemblage. The species are grouped together only on basis of the lack of specialized features defining the other groups. It is undoubtedly paraphyletic, but I have not been able to find an adequate way of splitting it up.

Key to species

1. Propodeum with dense golden or silvery tomentum, completely obscuring sculpture.... 2
- Propodeum at most with sparse golden or silvery tomentum, leaving sculpture easily visible 3
2. Large species: wing length 26-27 mm; legs largely reddish; New Guinea .... *rex* sp. n.
- Medium-sized species: wing length 13-19 mm; legs black; Moluccas, New Guinea, Bismarck and Solomon Islands, Australia .... *cognatus* Smith
3. Female: outer side of mid tibia only with normal, straight spines apically; male: apical margin of clypeus straight or slightly concave, without median lobe (fig. 17) 4
- Female: outer side of mid tibia with stout, curved spine apically (fig. 64); male: apical margin of clypeus with short median lobe (fig. 18) 6
4. Wings strongly yellowish to dark brown with violaceous effulgence; India to Moluccas, Philippines .... *praedator* Smith
- Wings basically clear, at most slightly yellowish and apically infuscate 5
5. Pilosity of head and mesosoma dense, yellowish brown; face and mesoscutum with dense brownish tomentum obscuring the sculpture; legs reddish; medium-sized species, wing length 19-20 mm; New Guinea .... *staudingeri* Gribodo
- Pilosity of head and mesosoma white to pale yellow; mesoscutum without dense tomentum, sculpture easily visible; legs black; small species, wing length 10.5-13.5 mm; Sumba, Timor, W. Australia .... *formosellus* Van der Vecht
6. Wings dark brown with bluish effulgence, legs dark; female: sixth tergite with pygidium (fig. 65); male: 3rd to 7th flagellomere with broad placoids (fig. 45); Burma to Sumatra, Borneo .... *walshae* sp. n.
- Colour of wings and legs variable; female: sixth tergite without pygidium; male: 3rd flagellomere rarely with placoid (only in specimens from Philippines and Java) (fig. 44); Sri Lanka to Philippines and Timor .... *subtruncatus* Dahlbom

Sphex cognatus Smith

Sphex cognatus Smith, 1856: 248. Holotype ♀: Australia (BMNH!!).
Sphex amator Smith, 1856: 246. Holotype ♂: Australia (OUM!).
Sphex formosus Smith, 1856: 254. Holotype ♀: Indonesia, Seram (BMNH!!).
Sphex opulentus Smith, 1856: 250. Holotype ♂: Australia, Richmond River (BMNH!!).

Distribution. – Indonesia (Maluku, Irian Jaya), Papua New Guinea, Bismarck Islands, Solomon Islands, Admiralty Islands, Australia.

Note. – Specimens from the North Moluccas (Halmaheira etc.) differ from the remaining populations in having silvery tomentum with a faint golden tinge, in particular on the propodeum.

Sphex formosellus Van der Vecht

Sphex formosellus Van der Vecht, 1957: 366. Holotype ♀: Timor (RMNH!!).

Distribution. – Indonesia (Timor, Sumba), W. Australia.

Sphex praedator Smith
(fig. 17)

Sphex praedator Smith, 1858: 14. Holotype ♂: Indonesia, Sulawesi (OUM!).
Sphex tyrannicus Smith, 1860: 122. ♀: Indonesia, Bacan (type lost, Van der Vecht 1973).
Sphex luteipennis Mocsary, 1883: 33. Lectotype ♀ (designated by Van der Vecht 1973): Indonesia, Ambon (TMB!)
Sphex nigripes var. *calopterus* Kohl, 1890: 168, 422 [as var. 5]. ♂: Indonesia, Sulawesi (NMW).
Sphex nigripes var. *kohlianus* Strand, 1913: 81 [new name for *S. nigripes* var. *calopterus* Kohl].
Sphex nigripes var. *celebesianus* Strand, 1913: 81. ♀, ♂:

Indonesia, Sulawesi (NMW) [name for *S. nigripes* var. 2 of Kohl (1890)].

Sphex nigripes var. *melanopodus* Strand, 1915: 89. Lectotype ♀ (designated by Van der Vecht 1973): Sri Lanka, Nalanda (NMW!)

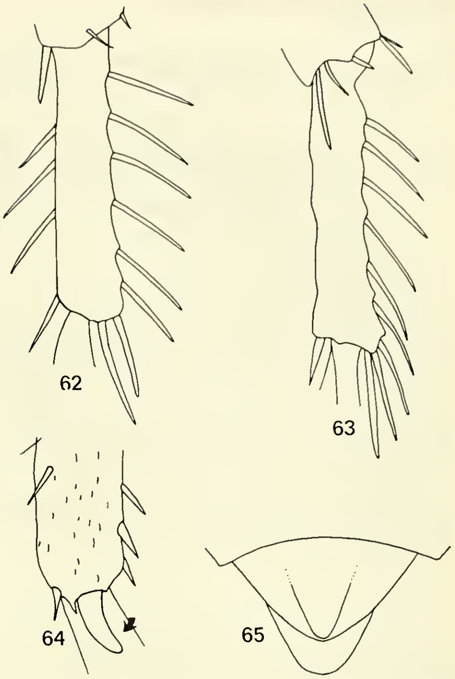
Distribution. – India and Sri Lanka to China and Malaysia, Indonesia (Sumatra, Sangihe Islands, Java, Sulawesi, Moluccas), Philippines.

Sphex rex sp. n.
(figs. 43, 61-62)

Type material. – Holotype ♀, Papua New Guinea, Milne Bay, KBMission, 5.iii.1944, K.V. Krombein (USNM). – Paratype: Indonesia, Irian Jaya, Ifar, 350 m, iii.1957, J. v.d. Assem (1 ♂, RMNH).

Diagnosis
This species is immediately recognized by its large size (body length 35 mm), reddish legs and dense golden tomentum on most part of mesosoma. In these respects it is similar only to *S. basilicus* from Australia, from which it differs as follows: petiole short, 0.35 times as long as hind basitarsus (0.5 in *basilicus*); 7th sternite of male with proximal transverse depression, 8th sternite trilobate (bilobate in *basilicus*); anterior femora of female ventrally covered with tomentum (with sparse erect pilosity in *basilicus*).

Description
Female. – Body length 36 mm, length of forewing 26 mm. Black, the following parts reddish: mandibles except base and apex, femora except basal half, tibiae, tarsi, tegulae except medially, sixth metasomal segment. Wings almost clear, apically infuscate. Pilosity yellow, on vertex and mesoscutal disc infuscate; head and mesosoma with conspicuous dense golden tomentum, completely obscuring sculpture of metanotum and propodeum, tomentum on anterior part of mesoscutal disc and scutellar disc dark brown; fore femora ventrally with tomentum and pilosity. Clypeus 0.85 times as long as IOC, with blunt median carina on dorsal half, apical margin with short median lobe; IOV 0.85 times IOC; labrum with median carina, which projects apically into a weak tooth; relative lengths of flagellomeres I-III 1 : 0.6 : 0.6. Mesosoma microsculptured, punctulate to punctulate-reticulate to shagreened (obscured by vestiture almost throughout); scutellum with median longitudinal impression; fore metatarsus with 8 rake spines, median spines 1.5 times metatarsal width, apical spine as long as second tarsomere; mid tibia with oblique, slightly curved spine apically. Petiole 0.35 times as long as hind basitarsus; sixth tergite without pygidium.



Figs. 62-65. *Sphex*. 62, *S. rex*, ♀, fore basitarsus; 63-65, *S. walshae*, ♀. 63, fore basitarsus; 64, distal part of mid tibia, outer side; 65, sixth tergite.

Male. – Body length 35 mm, length of forewing 27 mm. Like the female except for the following. Mandibles black, mid and hind femora nearly entirely black; 7th metasomal segment and 8th sternite reddish. First tergite and sides of 6th and 7th with conspicuous yellow pilosity. Clypeus 0.95 times as long as IOC; IOV 0.9 times IOC; labrum ecarinate; relative lengths of flagellomeres I-III 1: 0.65 : 0.65, 5th flagellomere with narrow concave placoid; sixth sternite apically shallowly emarginate, seventh sternite proximally transversely depressed, 8th sternite trilobate, middle lobe curved upward.

Etymology
Rex is a noun in apposition, from Latin *rex* = king.

Sphex staudingeri Gribodo

Sphex staudingeri Gribodo, 1894: 3. Holotype ♂: New Guinea (MCG!).

Distribution. – New Guinea.

Sphex subtruncatus Dahlbom
(figs. 44, 60)

Sphex subtruncatus Dahlbom, 1843: 25. ♀: 'Africa' (Museum Lund!) [probably from NE. India, see Van der Vecht (1973)].
Sphex nigripes Smith, 1856: 254. Syntypes ♀: China: Shanghai (BMNH!), Sumatra [non Fabricius, 1793].
Sphex siamensis Taschenberg, 1869: 413. ♀: 'Siam' (Mus. Univ. Halle!) [probably from the Philippines, according to Van der Vecht (notes)].
Sphex erythropodus Cameron, 1889: 108. Syntypes ♀: India (Mus. Calcutta).
Sphex sulciscuta Gribodo, 1894: 2. Holotype ♀: Philippines, Mindoro (MCG!).
Sphex nigripes var. *tsingtauensis* Strand, 1916: 81A (11): 107. Holotype ♂: China, Tsingtau [Qingdao] (DEI!!).
Sphex subtruncatus coraxus Van der Vecht, 1957: 365. Holotype ♀: Indonesia, Sumba, Pogobina (NMB!).
Sphex subtruncatus orius Van der Vecht, 1957: 366. Holotype ♂: Indonesia, Flores, Rana Mese (NMB!).
Sphex subtruncatus xuthus Van der Vecht, 1957: 364. Holotype ♂: Indonesia, Sumba, Bondo Kodi (NMB!).
Sphex subtruncatus krombeini Van der Vecht in Krombein, 1984: 28. Holotype ♀: Sri Lanka, Kanneliya Jungle (USNM!).

Distribution. – Sri Lanka and India to China and Malaysia, Indonesia (Sumatra, Bangka, Java, Kalimantan, Lombok, Flores, Sumba, Timor), Philippines.

Note. – *S. subtruncatus* exists in a number of geographic forms, which differ in colour (legs black to reddish, wings dark brown to clear), as well as in the number of placoids on the male flagellum.

Sphex walshae sp. n.
(figs. 18, 45, 63-65)

Type material. – Holotype ♀, Indonesia, S. Sumatra, 250 m, Bengkulu, Muara Tenam, 16-23.vii.1935, M. E. Walsh (RMNH). – Paratypes: India: Sikkim, Ari to Gnatong, 7-2500 ft, iv.1894, Bingham (1 ♀, USNM). Burma: Tenasserim, Ihaungyin Valley, v.1891, Bingham (1 ♀, BMNH). Malaysia: Malay peninsula, Kedah Peak, 3000-3500 ft, 15.iii.1928, H. M. Pendlebury (1 ♀, BMNH); Sarawak, C. J. Brooks (1 ♀, BMNH); Sabah, Sandakan, Baker (2 ♀, USNM); Sabah, 19 km N. of Kalabakan, 19.xi.1962, Y. Hirashima (1 ♀, BPBM); North Borneo, Frühstorfer (1 ♀, TMB). Indonesia. Sumatra: Anei kloof, 500 m, E. Jacobson (3 ♀, RMNH); Bengkulu, 50 m, 10-18.v.1935, M. E. Walsh (1 ♀, RMNH); Bengkulu, Bukit Item, 650 m, 11-15.vi.1935, M. E. Walsh (1 ♀, RMNH); Bengkulu, Tandjong Sakti, 1-10.vi.1935, M. E. Walsh (2 ♂ 1 ♀, RMNH); Lubuk Sikaping, 450 m, L. Lundeshagen (1 ♀, RMNH), Aur Kemanis, E. Jacobson (1 ♀, RMNH); no locality (1 ♀, Zoologische Staatssammlung, München). Kalimantan: Ketapan, v.1937, M. E. Walsh (2 ♀, RMNH); Sampagan, 0 m, 1927, M. E. Walsh (1 ♂, RMNH); South coast (1 ♀, RMNH); Kembang Djangut, 75 m, 24-30.xi.1956, A.M.R. Wegner (5 ♀, RMNH); no locality, Muller (1 ♂ 5 ♀, RMNH). 'Ind. or.?' (1 ♀, RMNH).

Diagnosis

This species is similar to other large, dark-winged, dark-legged forms: the representative of *S. subtruncatus* in the Philippines and the representative of *S. praedator* in the Moluccas (apart from species belonging in other groups). As these forms are allopatric, *S. walshae* may be separated from sympatric forms on the basis of the dark brown wings with violaceous effulgence. Unlike *S. praedator*, *S. walshae* has a stout curved spine at the outer end of the female mid tibia, and the male clypeus has a median apical lobe. In these respects *S. walshae* is similar to *S. subtruncatus*, from which it differs in having a pygidial plate in the female, and placoids on third to 7th flagellomere in the male (variable in *S. subtruncatus*, the mentioned condition occurring in specimens from the Philippines and Java).

Description

Female. – Body length 23-28 mm, length of forewing 17-20 mm. Black. Wings dark brown with violaceous effulgence. Pilosity of head and mesosoma black; clypeus and frons with sparse silvery tomentum, mesosoma with sparse, inconspicuous dark brown tomentum; fore femora ventrally with sparse erect hairs, no tomentum. Clypeus 0.8 times as long as IOC, without median carina, apical margin slightly raised and with a pair of short teeth medially; IOV 0.8 times IOC; labrum with median carina, which projects apically into a tooth; relative lengths of flagellomeres I-III 1 : 0.7 : 0.75. Mesosoma microsculptured: punctulate-reticulate to shagreened, mesonotum and mesopleuron largely shallowly punctate, punctures 1-2 diameters apart; propodeum finely rugose; scutellum with median longitudinal impression; fore basitarsus with 9-10 rake spines, median spines 1.5 times tarsal width, apical spine as long as second tarsomere; apex of mid tibia with stout curved spine. Petiole 0.4 times as long as hind metatarsus; sixth tergite with pygidium.

Male. – Body length 21-24 mm; length of forewing 16-18 mm. Like the female except for the following. Clypeus 0.9 times as long as IOC, apical margin with short, depressed median lobe; IOV 0.85 times IOC; labrum ecarinate; length of flagellomeres I-III 1: 0.75 : 0.75, third to seventh flagellomere with broad, flat placoid. Seventh sternite weakly emarginate; eighth sternite triangular.

Etymology

Walshae is a noun in genitive case, refering to Mrs. M. E. Walsh, collector of a substantial part of the type series.

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Received: 3 November 1990
Accepted: 7 January 1991